able locality, not yet decided upon; and, also, upon my advice, authorized the purchase of a 20-inch refractor for the new observatory.

The funds left by Mr. Chabot over twenty-five years ago, "to enlarge and add to the equipment of the observatory," is available for removal and new building, while the new telescope will be purchased by the School Department.

CHARLES BURCKHALTER.

OAKLAND, CAL., November, 1913.

RATES OF THE STANDARD CLOCKS AT THE LICK OBSERVATORY.

There are four clocks in use, keeping sidereal time. The Riefler clock case was closed in April, following the rating of the clock in the new case. Its mean rate for about five months has been $-0^s.25$ at temperature 55° Fahrenheit and pressure 0.646 m. There are no means of keeping the temperature constant within the clock case, but the location of the clock in the basement of the meridian-circle house, and the protection of double doors to the clock room, result in slow periodic fluctuation only. The computed change of rate for the past five months is $-0^s.01$ per degree Fahrenheit and the application of this change reduces the average residual, for periods of about one week, from $\pm 0^s.08$ to $\pm 0^s.06$. While the case has been practically air-tight, the changes of temperature produce corresponding fluctuations in the pressure amounting to $+0.0014$ m. per degree Fahrenheit. The range of temperature in five months has been twenty degrees, while the average weekly change is about three degrees.

The Dent clock has also been rated, from the corrections by direct observations of the stars, simultaneously with those for the Riefler rate. Its rate was changed the first of August, by the addition of a small weight placed on the pendulum shelf. The present rate is $+0^s.91$ at temperature 70° Fahrenheit, and the change of rate, for the last five months, is $+0^s.03$ per degree, corresponding well to that determined from the rating of many previous years. The application of this change reduces the average residual for the past five months, in weekly periods, from $\pm 0^s.11$ to $\pm 0^s.06$. The temperature for this

clock, in the inner room of the clock room, averages 8° above that of the Riefler, with about the same average weekly changes, but with smaller daily fluctuations.

For comparing the performance of these clocks, the rates of the two Höhwu clocks, No. 3 and No. 8, for the past two months are given below, with their residuals, and those of the Riefler and Dent, for the same period:—

	Rate.	v	Temperature Correction.
Riefler	$-0^s.34$	$\pm 0^s.04$	$\pm 0^s.03$
Dent.	$+0.91$	± 0.11	± 0.07
Höhwu, No. 3	$+0.13$	± 0.08	. . . . .
Höhwu, No. 8	$+0.57$	± 0.09	. . . . .

The rates of the two Höhwu clocks do not show any dependence upon the temperature.

The two mean time clocks, Frodsham and Howard, are rated to Pacific Standard time, and the rates are changed as often as necessary, by the use of small weights, to keep the errors within a small fraction of a second. R. H. TUCKER.

September 24, 1913.

NOTE ON COMET *c* 1913 (ZINNER-GIACOBINI).

A telegram received on October 24th announced the discovery of a comet by ZINNER and gave an observation of it on October 23d by HARTWIG at Bamberg. On the basis of this observation and two on October 24th and 25th by Dr. AITKEN of the Lick Observatory, parabolic elements and an ephemeris were computed.

On October 27th a telegram was received giving the elements computed at Kiel and also stating the suspected identity of this comet with Comet 1900 III. A conditioned solution of the orbit on the basis of the same three observations was immediately undertaken, the assumed period being that derived by KREUTZ for Comet 1900 III. The results of this conditioned solution established the identity of the two comets. Both the parabolic and elliptic elements and the ephemerides have been published in *Lick Observatory Bulletin,* No. 245.

The period of the comet is 6.464 years, this being the second return since its discovery in 1900 by GIACOBINI. It was not